Received: 27 June 2020 | Revised: 7 November 2020 | Accepted: 29 November 2020

DOI: 10.1111/jocn.15597

Journal of Clinical Nursing WILEY

SPECIAL ISSUE ARTICLE

A cross-sectional study of United States Academic-clinical research collaborations: Characteristics, resources, benefits and outcomes

Nancy M. Albert PhD, NE-BC, FAAN, Associate Chief Nursing Officer, Research and Innovation[1] | Esther Chipps PhD, RN, NEA-BC, Clinical Nurse Scientist Associate Professor of Clinical Nursing[2] | Colleen J. Klein PhD, APRN, FNP-BC, Education & Research Scientist, Center for Advanced Practice[3] | Isaac Briskin MA, Biostatistician[1] | Ann C. Falkenberg Olson PhD, FNP-BC, FAANP, Senior Research Scientist-Independent Consultant, St. Paul MN[4] | Linda Liu Hand PhD, Director, Office for Nursing Research and Scholarship[5] | Michelle M. Harmon PhD, RN, Associate Chief Nurse, Integrated Clinical Services[6] | Mary Heitschmidt PhD, APRN, FAHA, Director of Clinical Research; Co-Director, Center for Clinical Research and Scholarship; Assistant Professor[7] | AkkeNeel Talsma PhD, RN, FAAN, Associate Professor[8]

[1]Cleveland Clinic, Cleveland, OH, USA

[2]The Ohio State University Wexner Medical Center, The Ohio State University College of Nursing, Columbus, OH, USA

[3]OSF HealthCare, Peoria, IL, USA

[4]Gundersen Health System-Gundersen Medical Foundation, La Crosse, WI, USA

[5]University of Iowa College of Nursing, Iowa City, IA, USA

[6]John D. Dingell VA Medical Center, Detroit, MI, USA

[7]Rush System for Health, Chicago, IL, USA

[8]University of Wisconsin-Milwaukee College of Nursing, Milwaukee, WI, USA

Correspondence
Nancy M. Albert, Cleveland Clinic, Cleveland, OH, USA.

Funding information
All investigators provided in-kind support during all research processes and manuscript preparation. Statistical support was internally funded by the principal investigator's worksite.

Abstract

Aims: The aims of the study were to compare characteristics, resources, benefits and outcomes of academic-clinical collaborations of nursing researcher leaders from academic, clinical and joint-employer sites.

Background: Few research-based publications addressed academic-clinical research collaborations. New knowledge could increase nursing and multidisciplinary research productivity, including implementation science.

Design: An anonymous survey using a 40-item questionnaire.

Methods: Information letters with a link to the questionnaire were emailed to United States nursing research leaders. Data were grouped by institution type: academic, clinical or joint-employer. Analyses included Kruskal–Wallis tests for ordered responses, Pearson's chi-square test or Fisher's exact test for categorical responses and Cohen's Kappa agreement statistic for expected and actual time devoted to research. STROBE guidelines were followed.

Results: Of 120 respondents from academic (n = 60; 50.0%), clinical (n = 53; 41.2%) and joint-employer (n = 7; 5.8%) sites, 78.3%, 92.3% and 100%, respectively, were from metropolitan areas. Mean (SD) priority for active collaborations was higher at joint-employer sites; p = .002. Clinical sites were more likely to have directors of evidence-based practice (p = .031) and informatics (p = .008) and librarians (p = .029). Sites with collaborations were more likely to have access to research subjects (p = .008) and

EQUATOR research reporting checklist: STROBE

post-award research account management (p = .045). By collaboration status, there were no differences in the number of ethics board-approved studies. Collaborating site benefits were perceived to be executive leadership support (p = .003), greater research engagement by clinical nurses (p = .048), more co-authored publications (p = .048) and more abstracts accepted at national meetings (p = .044). Despite more resources and perceived benefits, outcomes did not differ by collaboration status.

Conclusions: Sites with and without academic-clinical research collaborations differed; however, outcomes were similar. Future efforts should focus on nurse scientist collaboration to address important clinical questions aimed at improving clinical outcomes.

Relevance to Clinical Practice: Despite some successful outcomes, potential benefits of academic-clinical research collaborations have not been fully actualised.

KEYWORDS
clinician-researcher, collaboration, professional development, research, research delivery

1 | INTRODUCTION

In the United States (US), academic-clinical nursing research collaborations are defined as research collaborations between academic- and clinical-based nurses or between academic and clinical sites. The overarching aim of an academic-clinical collaboration is to enhance the conduct, translation and dissemination of research that is important to nursing, multidisciplinary practice stakeholders and the populations served. In the US, academic-clinical nursing research collaborations can be formal and involve one or more nurse scientists (also known as nurse researchers; defined as nurses who are trained in and complete research as part of their paid job roles) who are cost-shared between sites (joint-employer status) or have one or more research projects with shared data and possibly, resources and budgets. Alternately, academic-clinical nursing research collaborations may be informal and involve two or more nurse and/or multidisciplinary scientists from academic and clinical sites who share a passion for a specific patient population or research theme. In informal collaborations, collaborators may change or be consistent over time, depending on the nature of their mutual research work and the working relationship between collaborators.

What does this paper contribute to the wider global clinical community?

- Executive nursing leadership support of academic-clinical nursing research collaborations is important and should be included as part of collaboration development.
- Priority for academic-clinical research collaborations was significantly higher for sites without collaborations (presumably because it is viewed as a desired resource); thus, academic and clinical nursing leaders should engage in discussions about collaborative best practices that foster new nursing research knowledge
- Of the seven joint-employer site respondents, all were located in metropolitan regions and over one-half were university-based academic medical centres. It will be important to learn more about nursing research productivity with and without academic-clinical collaborations among sites located in micropopulations and rural areas.

In the US, academic-clinical nursing research collaborations were theoretically believed to be advantageous. In two reports, they were thought to facilitate overall nursing and multidisciplinary research production, promote generalisability of nursing research findings, increase dissemination of research findings in peer-reviewed literature (Balakas et al., 2011), translate research findings into a clinical setting and incorporate findings into practice (Hendricks-Ferguson et al., 2017). Further, when academic-clinical research collaborations are formalised in joint-employer research roles, dissemination of outcomes may be heightened because nurse scientists involved have a stake in both settings. In one report of outcomes of nurse scientists with academic-clinical joint-employer status, among 15 extramurally funded grant reports, health system nurses were included as principal or co-investigators in 67% and were co-authors of 47% of published papers (Carter et al., 2020). Joint-employer outcome statistics are often based on clinical site expectations, capabilities and rationale for initiating joint-employer collaboration. Overall, research evidence of the value of academic-clinical collaborative experiences is lacking, as most research and review articles are based on single collaborative projects. Reflecting upon the American Association of Colleges of Nursing (2019) publication on guiding principles of partnerships, more knowledge is needed that specifically addresses US academic-clinical research collaborations.

2 | BACKGROUND

Many papers were available on the topic of academic-clinical collaborations, including US-based and global integrative and systematic reviews (Albert et al., 2019; Beal, 2012; De Geest et al., 2013); however, most papers were based on perspectives from experts, rather than research reports, and the primary aims were on how to make partnerships successful. Authors specifically focused on frequent communication, regularly scheduled meetings, generation of trust, transparency of expectations, strong leadership, a shared vision for the role and faculty buy-in as contributing factors of success (Balakas et al., 2011; Carter et al., 2020; Dobalian et al., 2014; Hendricks-Ferguson et al., 2017; Sahs et al., 2017). In addition, strong leadership and support from institutional leaders were factors associated with success when guiding specific academic-clinical research projects (Balakas et al., 2011; Dobalian et al., 2014; Hendricks-Ferguson et al., 2017; Sahs et al., 2017). Resources needed for success were rarely discussed. Individual skills and leadership support were important in one report (Hendricks-Ferguson et al., 2017) and, in another, authors found that lack of an ethics review board, medical library, databases and statistician resources were resolved when they collaborated with a university (Balakas et al., 2011).

Research reports of academic-clinical research collaborations were not well represented in the literature. It may be that academic-clinical research collaborations occur less often than anticipated; however, it should not be assumed that the absence of reports in the literature are due to a lack of interest by collaborating groups, ineffective or non-sustainable research processes or lack of real-world outcomes. The aims of this study were to examine geographic location, size and setting characteristics of participating US academic and clinical sites and to compare the priority for having active academic-clinical collaborations, expected and actual percentage of time devoted to research, nursing research-related resources, leadership support, benefits and outcomes based on sites' status as having academic-clinical collaborations.

3 | METHODS

3.1 | Design

A cross-sectional, exploratory descriptive questionnaire was distributed via email following ethics review board approval (number 18–253) from the first author's (principal investigator) site. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist for reporting observational (cross-sectional) studies was used as a guideline (File S1).

3.2 | Setting and Sample

Nurse research leaders working in academic (colleges and universities with bachelor's, master's and doctoral nursing programs) and clinical (hospitals and health care settings with broad-spectrum acute care, with or without ambulatory care) nursing service settings who were involved in or had oversight of clinical research in their academic or clinical institution or setting were the target population of participants. To achieve a generalisable sample, members of the Midwest Nursing Research Society were invited to participate. Management personnel from the organisation sent an electronic request with the ethics board-approved cover letter and a link to the questionnaire using their internal list of members. The Midwest Nursing Research Society was founded in 1980 after a group of 21 academic-based nurses from the Midwest U.S. met to work on a nursing faculty research project in 1975. Their goal was to create and sustain an organisation dedicated to nursing research. Today, there are 1400 members and the mission of the organisation is to bring scientists, innovators and nurses who drive clinical practice together to grow the foundation of nursing through innovative research (https://mnrs.org). Members are most often academic- and clinically based nurse scientists, academic nursing leaders (deans, associate deans and those serving in clinical student leadership roles) and students working towards baccalaureate or graduate degrees, especially those who are interested in a nursing scientist career or completing research as part of their college degree. Although the organisation is named "Midwest" to refer to the Midwest section of the U.S., and annual meetings rotate between states located in the Midwest U.S., organisational members can be from any state.

In the electronic recruitment letter, we requested that only one leader respond from each site, so that results would not be biased or duplicated. We encouraged Midwest Nursing Research Society members to forward the request to a research leader within their organisation if they were not the right person or, if they were a healthcare centre with multiple hospital sites. In total, the Midwest Nursing Research Society reported that their non-student membership was comprised of 161 sites; of which 125 were academic and 36 were clinical (hospital or healthcare centre) sites. Thus, the convenience sample included nurse leader researchers who received an electronic request to participate and who completed the electronic questionnaire.

As the distribution of respondents in academic and clinical Midwest sites was unknown when sample size calculations were performed using SAS software (Cary, NC), replies from at least 50 respondents in two of the three sites types (academic and clinical) were expected. Assuming this minimum threshold for response, 90% power was expected to detect moderate to large effect sizes of at least 0.65, with a similar power detecting differences in relative frequencies of binary events of at least 30% at a 0.05 significance level.

In this study, research was defined using the United States Department of Health and Human Services (2009) definition: "a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalisable knowledge" (p. 131). This definition was placed within the questionnaire to promote a systematic understanding of investigator intent

when asking questions related to nurses conducting research. The term collaboration was not pre-defined; thus, its interpretation was based on individual respondent perceptions.

3.3 | Factors studied and measurement

All outcomes were reflected in an anonymous 40-item questionnaire developed specifically for this research project. Items were developed by a research committee that included the principal and co-investigators of this study and members of the Midwest Nursing Research Society's Research through Academic-Clinical Partnerships research interest group. Thirty-nine items with various response options (fill in the blank, choose one answer, or choose all that apply) were used to assess perceptions. The final item allowed for open comments about academic-clinical partnerships. Content validity testing was completed for study categorised themes: outcomes, resources, barriers, benefits and overall leadership support. Nine experts (three academic nurse scientists, three clinical nurse scientists, one nurse leader and two academic-clinical dual-employed researchers) completed content validity assessments using the Lynn (1986) content validity methodology. Overall content validity index, reflecting the relevance of items, was 0.958, well above the 0.78 endorsement requirement needed to establish content validity. Post-review, some items were revised slightly for clarity or to add response options, for completeness; no questions were eliminated.

Of the 39 items with response options, six questions focused on perceptions of usefulness of collaborations, priority of research collaboration (on a scale of one [lowest priority] to five [highest priority]), overall actual leadership support for academic-clinical collaboration (using a Likert-type scale of nine options that were re-categorised in analyses to four levels: high support, moderate support, some support to neutral and non-support or support varies), potential resources (checklist of 26 options; check all that apply), potential benefits considered to be valuable to research productivity (checklist of 32 options; check all that apply) and availability of positions important to research productivity (measured based on full time effort from 0–1.0). Fourteen questions focused on understanding the scope of conducting nursing research, amount of time devoted in research (using seven response options [0%, varies by role, and five options of 20 percentage points each]), type and formality of collaborations (checklists), and clinical research outcomes. Clinical outcomes included the frequency over a one-year period by nurse scientist principal investigators and nurse collaborators who were not nurse scientists; for example, they could be clinical nurses participating in research. For principal investigators, questionnaire items included participating in (a) conference presentations, (b) research conferences/workshops, (c) grant submissions and (d) new research projects. For nurse collaborators, questionnaire items included: (a) co-authored publications, (b) co-authored conference presentations/posters and (c) co-submit research grant proposals and a combination of all outcomes. The final 19 items focused on academic and clinical site characteristics (check boxes based on options provided). A Research Electronic Data Capture (REDCap) questionnaire was created, and based on responses to some items, questions were hidden from view when they did not apply to the participant's situation. For example, if the responder was a research leader in both an academic and clinic site (joint-employer status), they completed two extra questions, one on the negotiated or agreed time working in each site and the institution role (academic or clinical) that was more demanding in terms of knowledge work. In another example, for sites that did not engage in academic-clinical research collaborations, programming within the questionnaire led to skipping of five questions that only applied to sites with academic-clinical collaborations.

3.4 | Data collection

Electronic mail messages were sent via a listserv of all members of the Midwest Nursing Research Society (regardless of job role) and to members of the Academic-Clinical Partnership Research Information Group. The message had an ethics review board-approved research information sheet attachment that included a link to the REDCap electronic capture data tool hosted at the principal investigator's site and the contact information of the principal investigator. Members of the Research through Academic-Clinical Partnerships research interest group were also asked to forward the email with attachment to their nurse leader and nurse researcher leader colleagues. The number of people who received the request to participate was not counted, as investigators did not have control of all outgoing messages.

3.5 | Analysis plan

Characteristics of the cohort were summarised using frequencies and percentages for nominal factors and ordinal measures with fewer than 10 unique values. Ordinal measures with more levels were summarised using medians and quartiles (quartile 1 and 3). Most question responses were ordered data; responses were analysed using Kruskal–Wallis one-way analysis of variance tests. Categorical responses were analysed with Pearson's chi-Square test and Fisher's exact test, where appropriate. Cohen's Kappa agreement statistic was used to measure agreement between responses for expected time devoted to research and actual time devoted to research. Analyses were performed using SAS software (version 9.4; Cary, NC). All analyses were two-sided and *p*-values under .05 were considered statistically significant.

4 | RESULTS

A total of 123 nurse leaders or nurse research leaders responded to the questionnaire. The response rate, based on 125 non-student member academic sites within the Midwest Nursing Research Society, was 48%. The clinical site response rate was 47% higher than the number of sites that represented clinical site society members and reflected that members within multi-hospital systems encouraged colleagues from their system hospital sites to participate.

After removing three questionnaires that had incomplete data, 120 (97.6%) were used in analysis. When grouped by respondent work site, 60 (50%) represented colleges of nursing (academic), 53 (41.2%) were received from hospital (clinical) sites and seven (5.8%) represented respondents from academic-clinical joint employers that had an approximate 50% commitment to each site. Of the sample, 97 (80.8%) respondents were from Midwestern states; other respondents were from the Northeast (n = 8, 7.1%), South (n = 11, 9.8%) and Western U.S. (n = 1, 0.9%). By location, 78.3% (n = 47), 92.3% (n = 49) and 100% (n = 7) of academic, clinical and joint-employer sites, respectively, were from metropolitan areas.

Of participating academic (n = 60) and clinical sites (n = 53), community status differed, p = 0.019 (Pearson's chi-square test). Of academic sites, 40% (n = 24) were public, 21.7% (n = 13) were not-for-profit, 16.7% (n = 10) were religious, 16.7% (n = 10) were university-based academic medical centres and 5% (n = 3) were private-for profit or none of the above. Of participating clinical sites (n = 52 of 53 sites), 42.3% (n = 22) were private, not-for-profit, 23.1% (n = 12) were university-based academic medical centres, 17.3% (n = 9) were religious-based centres, 11.5% (n = 6) were public or Veteran Affairs medical centres and 5.7% (n = 3) were private-for profit or none of the above.

By academic site size, 43.3% (n = 26) served more than 500 students/year, 33.3% (n = 20) served 301–500 students/year and 23.3% (n = 14) served 300 or less students/year. By clinical site institution size (n = 51 of 53 sites), 31.4% (n = 16) of sites had 501–999 beds, 27.4% (n = 14) had 1000 or more beds, 23.5% (n = 12) had 301–500 beds and 17.6% (n = 9) had 150–300 beds. Clinical sites with less than 150 beds did not participate. Of the seven joint-employer sites, 57.1% of respondents (n = 4) were from university-based academic medical centres and 42.9% (n = 3) were from private, not-for-profit sites. Of joint-employer sites, 71.4% (n = 5) of the academic partners serve >500 students/year and the other two (28.6%) academic partners served between 150–500 students/year. Of joint-employer clinical partner sites, 42.9% (n = 3) had 1000 or more beds; followed by 42.9% (n = 3) with 150–300 beds and one clinical partner site (14.3%) had 501–999 beds.

Based on site type, 90% (n = 54) of academic, 96.2% (n = 51) of clinical and 100% (n = 7) of joint-employer sites conducted nursing research (p = .38). When assessing the amount of time devoted to research, data were collected based on seven categories (0%, varies by role, and five options of 20 percentage points each). Of academic and clinical sites, median values based on categories of responses [Quartile 1, Quartile 3] of expected time to be devoted to research was 27.5% [Q1 15.0, Q3 47.5] and 28.0% [Q1 15.0, Q3 45.0], respectively, p = .91 by Kruskal–Wallis test and actual time devoted to research was higher than what was expected, but did not differ by site types, 37.5% [Q1 20.0, Q3 45.0] and 40.0% [Q1 25.0, Q3 40.0], respectively, p = .84 by Kruskal–Wallis test. When assessing nine job roles common to research work, only three roles were significantly different based on academic versus clinical site type, by Kruskal–Wallis test. Academic sites were less likely than clinical sites to employ a director of evidence-based practice, median [Q1, Q3]: 0.0 [Q1 0.0, Q3 0.0] versus 0.25 [Q1 0.0, Q3 0.80], p = .031, a director of informatics, 0.0 [0.0, 0.28] versus 1.0 [0.20, 1.00], p = .008, and librarians, 1.00 [Q1 0.80, Q3 2.0] versus 0.20 [Q1 0.00, Q3 1.50], p = .029. There were no differences in the number of positions by academic and clinical sites for dean/director of research, research support staff, biostatistician, statistical programmer, data analyst and art/photography personnel.

TABLE 1 Characteristics of formalisation by sites with academic-clinical research collaborations[a]

Collaboration formalisation characteristics	Academic N = 44	Clinical N = 28	P value
In writing	27 (45.0)	13 (24.5)	.023
Publically declared	8 (13.3)	4 (7.5)	.32
Hold joint space	5 (8.3)	3 (5.7)	.72
Mentions on site website	12 (20.0)	3 (5.7)	.025
Members meet at other site regularly	20 (36.7)	10 (18.9)	.036
Collaboration is "individual-based", no formalisation or space	19 (31.7)	12 (22.6)	.28
Method of formalisation			.19
Legal contract	3 (6.8)	2 (7.1)	
Memorandum of understanding	15 (34.1)	9 (32.1)	
None needed-part of one system	0 (0.0)	2 (7.1)	
Part of salary buy-out	3 (6.8)	0 (0.0)	
Documented, but none of the above	5 (11.4)	2 (7.1)	
None needed or wanted; or have a policy	12 (27.2)	13 (46.5)	

[a]Of respondents from 120 sites, 78 had academic-clinical collaborations (44 of 60 [73.3%] academic sites, 28 of 53 [52.8%] clinical sites and 6 of 7 [85.7%] joint-employer sites). Data in this table do not include the 6 joint-employer sites as there were too few cases.

Of the 120 sites, 78 (65%) had academic-clinical collaborations and 42 (35%) did not. Of the 78 sites with academic-clinical collaborations, engagement did not vary by site type: academic sites n = 44 of 60 (73.3%), clinical sites n = 28 of 53 (52.8%) and joint-employer sites n = 6 of 7 (85.7%), p = .068 (by Pearson's chi-square test); but numerically, collaborations were highest for joint-employer sites. Characteristics of sites with academic-clinical collaborations are provided in Table 1. About one-quarter of all collaborations involved individuals who chose to collaborate across sites and did not have a formal commitment in writing. Overall, of sites with collaborations, academic sites were more likely to formalise their collaborations in writing, mention them on their website, and hold regular meetings at the collaborating site.

Priority for active academic-clinical collaborations differed by collaboration status (yes versus no). Median [Q1, Q3] priority for research collaborations was higher for sites without collaborations; with collaborations, 2.0 [Q1 1.0, Q3 2.0] and without collaborations, 3.0 (Q1 2.0, Q3 4.0], respectively, $p < .001$ by Kruskal–Wallis test.

When resources were assessed by collaboration status, sites with academic-clinical collaborations were more likely to have access to research subjects and research account management support for post-grant award work; see Table 2; however, no difference was found in the median [Q1, Q3] number of resources of sites with and without academic-clinical collaborations: 15.0 [Q1 10.0, Q3 20.0] versus 12.5 [Q3 8.0, Q3 22.0], $p = .22$. Of note, six of seven least important nursing research resources were related to two themes: (a) meeting student needs (ability for research doctoral students to meet clinical and/or research dissertation requirements at the respondent's sites and ability for clinical doctorate students to meet evidence-based practice change or quality improvement requirements at the respondent's site) and (b) enhancing education/knowledge (protected time for meeting with a protégée, mentee or student; access to research educational programming [for example, grant writing workshops]; instructional workshops and online how-to educational opportunities).

Executive leadership support of academic-clinical collaborations was an important factor in academic-clinical collaborations, Fisher's exact test $p = .003$. For example, by collaboration status, when assessing responses reflecting leaders as "highly or moderately supportive" of academic-clinical collaborations, 59 of 78 (75.6%) leaders of collaborating sites versus only 20 of 42 (47.6%) leaders of non-collaborating sites were highly supportive.

Of 32 potential benefits assessed, all but "other" were reported by at least 20% of respondents. By individual items, three benefits were perceived as more important to sites with academic-clinical collaborations versus those without collaborations, respectively (by Pearson's chi-square test); *n* (%): engagement of clinical nurses, 55 (70.5%) versus 22 (52.4%), $p = .048$; number of co-authored publications, 42 (53.8%) versus 14 (33.3%), $p = .032$; and abstract acceptance at national meetings, 33 (42.3%) versus 10 (23.8%), $p = .044$ (see Table 3). When the number of benefits were assessed by collaboration status (yes versus no), no differences were found in the median [Q1, Q3] number of benefits, 15.5 [Q1 8.0, Q3 21.0] versus 14.0 [Q1 6.0, Q3 22.0], $p = .50$ (Kruskal–Wallis test).

Outcomes of interest were based on receiving one-year's data based on nurse scientist principal investigator and nurse collaborator output. There were no differences in principal investigator outcomes based on collaboration status (yes versus no); median [Q1, Q3] conference presentations: 5.0 [Q1 2.0, Q3 8.0] versus 2.0 [Q1 2.0, Q3 8.0], $p = .41$; leading a research conference: 2.0 [Q1 2.0, Q3 5.0] versus 2.0 [Q1 0.00, Q3 2.0], $p = .13$; grant funding submissions: 2.0 [Q1 2.0, Q3 5.0] versus 2.0 [Q1 0.00, Q3 2.0], $p = .073$; and led new research projects: 2.0 [Q1 2.0, Q3 5.0] versus 2.0 [Q1 2.0, Q3 5.0], $p = .55$. However, when the total number of research-related outcomes were combined, sites with academic-clinical collaborations had higher output than sites without collaborations; median [Q1,

TABLE 2 Resources that provide value to research collaborations, by status

Resources	Collaboration Status		
	Yes; *N* = 78	No; *N* = 42	*p* Value*
Statistical consultation	63 (80.8)	31 (73.8)	.38
Leadership support	60 (76.9)	31 (73.8)	.70
Librarian support	59 (79.6)	30 (71.4)	.62
Data computing/management software	58 (74.4)	27 (64.3)	.25
Use of a library	56 (71.8)	28 (66.7)	.56
Protected time of research scientist	55 (70.5)	30 (71.4)	.92
Access to people who can be subjects of research	61 (78.2)	23 (54.8)	.008
Grant/manuscript writing support	52 (66.7)	29 (69.0)	.79
Regular meetings by collaborating members	50 (64.1)	23 (54.8)	.32
Access to institutional review board consultation	50 (64.1)	20 (47.6)	.08
Seed (start-up) grant funding	47 (60.3)	24 (57.1)	.74
Access to research databases	43 (55.1)	24 (57.1)	.83
Mission/vision of collaboration as a priority	47 (60.3)	23 (54.8)	.56
Computing or technology support	44 (56.4)	19 (45.2)	.24
Research grant budget preparation support	44 (56.4)	19 (45.2)	.24
Budget for supplies and equipment	43 (55.1)	21 (50.,0)	.59
Secretarial support	42 (53.8)	19 (45.2)	.37
Budget for research assistant support	40 (51.3)	19 (45.2)	.53
Research account management (post-award)**	39 (50.0)	13 (31.0)	.045
Protected time of protégée, mentor or student	38 (48.7)	20 (47.6)	.91
Access to research education programming	34 (43.6)	15 (35.7)	.40
Meeting time for clinical doctorate students	35 (44.9)	16 (38.1)	.47
Meeting time for research doctorate students	30 (38.5)	16 (38.1)	.97
Instructional workshops	23(29.5)	13(31.0)	.87
Online how-to educational opportunities	18(23.1)	9(21.4)	.84
Access to research databases	4 (5.1)	1 (2.4)	.66

*Pearson's chi-square test.

**Refers to support staff who manage research accounting paperwork, assure that research funding is used as planned and assess effort reporting of personnel completing funded research (as required).

TABLE 3 Benefits of academic-clinical research collaborations, by status

Benefits; *n* (%)	Collaboration status		*p* Value*
	Yes; *N* = 78	No; *N* = 42	
Facilitates collaboration between experts	69 (88.5)	34 (81.0)	.26
Allows practice to inform research	50 (64.1)	27 (64.3)	.98
Supports implementation science research	48 (61.5)	26 (61.9)	.97
Improves national reputation of the site	47 (60.3)	23 (54.8)	.56
Improves local reputation of both collaborating sites	52 (66.7)	22 (52.4)	.12
Enhances chance of national research grant funding	45 (57.7)	22 (52.4)	.58
Increases engagement of clinical nurses in research	55 (70.5)	22 (52.4)	.04
Increase site/academic faculty in research	42 (53.8)	22 (52.4)	.88
Decrease time needed to conduct research/collect data	36 (46.2)	22 (52.4)	.51
Speeds up research start-up	35 (44.9)	22 (52.4)	.43
Facilitates discussions about the value of nursing research	45 (57.7)	21 (50.0)	.42
Increases branding of site as a leader in research and EBP	41 (52.6)	21 (50.0)	.79
Increase educational opportunities in research and EBP	38 (48.7)	21 (50.0)	.89
Sharing of research costs between collaborating sites)	32 (41.0)	21 (50.0)	.35
Generates synthesis of evidence-based clinical practices	31 (39.7)	21 (50.0)	.28
Appreciation for contributions of collaborating partners	36 (46.2)	20 (47.6)	.88
Enhances chance of national research grant submission	44 (56.4)	19 (45.2)	.24
High-quality research and EBP educational offerings	41 (52.6)	19 (45.2)	.44
Engages nurses; workplace retention/slowing turnover	36 (46.2)	19 (45.2)	.92
Timely research and EBP educational offerings	36 (46.2)	18 (42.9)	.73
Increase protected time to conduct collaborative research	28 (35.9)	17 (40.5)	.62
Increase # research grants co-awarded to sites	34 (43.6)	15 (35.7)	.40
Increases publications co-authored by sites	42 (53.8)	14 (33.3)	.032
Speeds up manuscript writing and submission to a journal	31 (39.7)	14 (33.3)	.49
Make sites attractive to instructor/clinical nurse recruits	34 (43.6)	13 (31.0)	.18
Speed up data cleaning	14 (17.9)	13 (31.0)	.10
Speed up and/or funds statistical analysis processes	27 (34.6)	12 (28.6)	.50
Saves costs of supplies/electronic software programs	20 (25.6)	11 (26.2)	.95
Decreased time to learn about published changes in EBP	15 (19.2)	11 (26.2)	.38
Increase abstract acceptance at a national meeting	33 (42.3)	10 (23.8)	.044
Speed up abstract submission to a national meeting	21 (26.9)	10 (23.8)	.71
Facilitates poster creation by the team	19 (24.4)	10 (23.8)	.95
Other	5 (6.4)	1 (2.4)	.66
No benefits apply	2 (2.6)	0 (0.0)	.54

*All *p*-values are Pearson's chi-square test except "other" and "no benefits apply", Fisher's exact test.

Q3], 15.0 [Q1 9.0, Q3 23.5] versus 6.0 [Q1 4.0, Q3 15.0], $p < .001$ (all analyses by Kruskal–Wallis tests). Although the median [Q1, Q3] number of active ethics review board-approved research studies was higher among joint-employed sites (21 [Q1 10.0, Q3 50.0]) compared to academic (5 [Q1 3.0, Q3 10.0]) and clinical (7.0 [Q1 4.0, Q3 15.0]) sites, $p = .023$ by Kruskal–Wallis test; when assessed by collaboration status, no differences were found between sites with and without collaborations (7 [Q1 4.0, Q3 15.0] versus 6 [Q1 2.0, Q3 12.0], $p = .42$), respectively. Finally, among 120 sites, only the 78 sites with collaborations provided outcomes data by non-scientist nurse collaborators. In the previous year, the median [Q1, Q3] number of co-authored papers for publication were 2.0 [1.0, 3.0], conference presentations or posters were 2.0 [2.0, 4.0] and research proposals submitted for funding were 1.0 [1.0, 2.0].

5 | DISCUSSION

Although there is a plethora of literature regarding academic-clinical educational collaborations, partnerships in research are

not commonly cited. In DeGeest et al. (2013) systematic review of academic-clinical partnerships, authors reported that a majority of collaborations were focused on education and practice initiatives; only 39.5% included research. The mutual benefits and successes of research partnerships were anecdotally described by several organisations such as the Cincinnati Partnership for Nursing Research (Tubbs-Cooley et al., 2013), the Duke Translational Science Nursing Institute (Granger et al., 2012) and an urban setting in Dublin, Ireland (McKee et al., 2017). Although evidence of successful research collaborations exists, our findings provide new knowledge that collaborations were not likely to occur as formal partnerships.

In this study, research collaborations among nurse scientists were lowest among clinical sites and highest among sites with scientists who were jointly employed; however, the breadth and depth of academic-clinical collaborations in terms of experiences (for example, one-time versus long-term relationships) were not elucidated. Despite that leaders from academic, clinical and joint-employer sites indicated a desire to collaborate ranging from moderate to high priority, less than half of respondents had formal agreements of some type. Based on our findings, when collaborations occurred, they did so serendipitously or were based on mutual interests by collegial scientists and generally arose outside of formal or informal contractual agreements. Even if an academic or clinical site sought a research collaboration when completing strategic planning, the low use of contractual agreements could have stifled one or both parties' enthusiasm for maintaining a partnership over time. More research is needed to learn the rationale for not formalising research collaborations between academic and clinical sites, as findings may lead to changes in structures, systems or processes that would make formalisation more attractive to one or both groups.

Very few differences were found in perceived value of shared resources and actual benefits between collaborating and non-collaborating institutions. If nursing research leaders have the necessary resources to conduct and disseminate research without engaging in research collaborations, the time and effort to sustain a collaboration may not provide sufficient return on investment. Although clear benefits of academic-clinical collaborations were generally not found based on quantitative outcomes, perceptions of leaders reflected benefits related to research dissemination and more engagement of clinical nurses. Thus, academic-clinical research collaborations might occur when one of two situations exist: (a) there is a necessity to enhance research productivity or dissemination, or (b) collaboration with specific scientists or clinicians meets a personal, professional or project-specific need that is not solely productivity-based. Leaders in the former track may be more likely to formalise relationships and promote productivity outcomes than those in the latter track who may be indifferent to the collaboration status or outcomes beyond the reason for collaboration. The results of this study are novel and require replication within the US and globally. As more research findings become available, the true value of shared resources, including nurse scientists, will become more apparent.

Our research goals did not include rigorously assessing detailed outcomes; we simply obtained perceptions of leaders. A more robust research design with clear research productivity outcomes between collaborating and non-collaborating sites might show greater perceived and actual benefits; especially since education-focused academic-clinical partnerships have been successful in regard to educational innovations (Huston et al., 2017), clinical outcomes (Nabavi et al., 2012; Sadeghnexhad et al., 2018) and faculty benefits, including maintenance of clinical skills and funding for clinical faculty salaries. Various influential factors within organisational cultures may also contribute to perceptions of value of academic-clinical collaborations in nursing research.

Given the history of success in educational partnerships between academia and clinical organisation, lack of equivalent benefits in the research domain could be based on the differing research missions of academic and clinical organisations. Historically, academic organisational models are driven by university tenure and promotion guidelines that place a greater emphasis on a focused research trajectory, high levels of external funding obtainment and documentation of a sustained level of scholarship and publications by faculty. As long as the current tenure track system is in place, research faculty may be challenged to actively engage in clinical research unless there is a dedicated research office with expertise and history or successful grant submission and management. In contrast, clinical organisation research agendas are often driven by local or global clinical problems that require immediate solutions or assessment (Siedlecki & Albert, 2020); and when internally funded, there may not be a need to withstand the lengthy process involved in applying for external funding. For some clinical sites, the need to engage clinical nurses in research and expectations for research criteria are driven by the American Nurses Credential Center Magnet® Program (Erickson & Pappas, 2020). Additionally, role expectations of traditional faculty members and hospital-based scientists are different. In a survey of hospital-based scientists, 87% of respondents reported that the majority of their time was focused on facilitating the research of staff rather than developing their own programs of research (Logsdon et al., 2017). Surprisingly, in this study, the amount of time actually devoted to research was consistent across all three categories of site respondents (academic, clinical and joint-employed), with none reporting a high percentage of time spent on research.

Despite literature that supports joint academic-clinical appointments (Carter et al., 2020; Heitschmidt et al., 2020), very few respondents were in institutions with joint employments. Although joint-employer site characteristics differed, over 50% were academic medical centres and all but one respondent was engaged in a research collaboration. Since respondents from joint-employer sites had high priority for research and significantly more active ethics-approved studies compared to nurse scientists at academic and clinical sites, joint appointments may be an ideal mechanism to enhance nursing research productivity. Finally, perceived support of executive leadership was higher among collaborating sites and nearly all joint-employer sites had academic-clinical collaborations. Leadership support for collaborations has been cited in other literature (Beal, 2012; Carter et al., 2020; DeGeest et al., 2013; Heitschmidt et al., 2020) and may ultimately be the driver for strong academic-clinical

collaborations if executive leader culture reflects high value for evidence-based practices and research evidence. Although beyond the scope of this research, it will also be important to learn whether research-based joint-employer status truly enhances research capacity over time (overall) and among specific scientists and clinicians. Further, it will be important to learn whether implementation science and diffusion of research into practice are enhanced.

This research study has some limitations. There was a small number of joint-employer sites and six of seven had academic-clinical research collaborations, making it difficult to truly assess factors of interest to investigators. The responding US sites were more likely to be in metropolitan areas; thus, results may not be generalisable to US micro-population and rural sites. There is a need to learn more on this topic from an international perspective. The operational definition of collaboration may not have been uniformly applied by nurse researcher leader respondents. For example, it could have been defined based on one academic-clinical research project or multiple, ongoing projects among teams and sites regardless of formal agreements. Some factors assessed, such as time devoted to research and the number of active, ongoing research projects per site can change based on site strategic goals, personnel availability and other factors. The findings of this research were based on questionnaire findings from one point in time; more research is needed to determine whether findings are replicable. Research respondents were academic or clinical nurse leaders or research leaders who may not be aware of all research activities in motion at their sites. Missing data were noted for a few of the assessed factors from some participants; these data were not imputed in analysis.

6 | CONCLUSION

The results of this study provide insights related to the characteristics of sites with academic-clinical collaborations, resources, benefits and leadership support. In particular, the resource that was most relevant to collaboration was access to research subjects. Leaders may be able to use that resource to formalise partnerships to advance nursing science. In light of the challenges present in today's healthcare environment, strong and dedicated leadership support of nursing research is necessary for continued engagement of nurses in research and scholarship and in achieving research-based outcomes.

7 | RELEVANCE TO CLINICAL PRACTICE

Despite some successful outcomes, potential benefits of academic-clinical research collaborations in the US have not been fully actualised. Formalised collaborations and/or joint appointments of nurse scientists may be one avenue for securing support for nurse engagement in research-related activities. Collaborative research partnerships may effectively enhance the study of complex clinical problems with larger samples and more diverse populations, thus helping to advance generalisable nursing research focused on improving and maximising health outcomes.

ACKNOWLEDGEMENTS

We thank the members of the Academic-Clinical Partnership Research Interest Group and the leaders of the Midwest Nursing Research Society for their support of this research.

CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest to disclose regarding this research.

AUTHOR CONTRIBUTIONS

All authors with the exception of Isaac Briskin participated in conception and design of the research study, interpretation of findings and critical revision of the manuscript. Dr. Nancy Albert was responsible for elements above and in addition, acquisition of data, drafting of the manuscript and manuscript revisions and analysis. Isaac Briskin completed statistical analyses.

ORCID

Nancy M. Albert https://orcid.org/0000-0002-3619-966X
Esther Chipps https://orcid.org/0000-0002-0897-0875
Colleen J. Klein https://orcid.org/0000-0002-9666-5837
Ann C. Falkenberg Olson https://orcid.org/0000-0001-9752-0667

REFERENCES

Albert, N. M., Chipps, E., Falkenberg Olson, A. C., Liu Hand, L., Harmon, M., Heitschmidt, M. G., Klein, C. J., Lefaiver, C., & Wood, T. (2019). Fostering academic-clinical research partnerships. *Journal of Nursing Administration*, *49*(5), 234–241. https://doi.org/10.1097/NNA.0000000000000744.

American Association of Colleges of Nursing (2019). *Guiding principles to academic-practice partnerships*. Retrieved from https://www.aacnnursing.org/Academic-Practice-Partnerships/The-Guiding-Principles.

Balakas, K., Bryant, T., & Jamerson, P. (2011). Collaborative research partnerships in support of nursing excellence. *Nursing Clinics of North America*, *46*(1), 123–128. https://doi.org/10.1016/j.cnur.2010.10.006.

Beal, J. A. (2012). Academic-service partnerships in nursing: an integrative review. *Nursing Research and Practice*, *2012*, 501564. https://doi.org/10.1155/2012/501564.

Carter, E. J., Hessels, A., Cato, K., Sun, C., Cohen, B., Rivera, R. R., & Larson, E. (2020). Evaluation of the joint nurse scientist role across academic and practice. *Nursing Outlook*, *68*(3), 261–269. https://doi.org/10.1016/j.outlook.2019.10.003.

De Geest, S., Dobbels, F., Schonfeld, S., Duerinckx, N., Sveinbjarnardottir, E. K., & Denhaerynck, K. (2013). Academic service partnerships: what do we learn from around the globe? A systematic literature review. *Nursing Outlook*, *61*(6), 447–457. https://doi.org/10.1016/j.outlook.2013.02.001.

Dobalian, A., Bowman, C. C., Wyte-Lake, T., Pearson, M. L., Dougherty, M. B., & Needleman, J. (2014). The critical elements of effective academic-practice partnerships: a framework derived from the Department of Veterans Affairs Nursing Academy. *BMC Nursing*, *13*(1), 183. https://doi.org/10.1186/s12912-014-0036-8.

Erickson, J. I., & Pappas, S. (2020). The value of nursing research. *Journal of Nursing Administration*, *50*(5), 243–244. https://doi.org/10.1097/NNA.0000000000000876.

Granger, B. B., Prvu-Bettger, J., Aucoin, J., Fuchs, M. A., Mitchell, P. H., Holditch-Davis, D., Roth, D., Califf, R. M., & Gilliss, C. L. (2012). An academic-health service partnership in nursing: lessons from the field. *Journal of Nursing Scholarship*, *44*, 71–79. https://doi.org/10.1111/j.1547-5069.2011.01432.x.

Heitschmidt, M., Staffileno, B., & Kleinpell, R. (2020). Implementing a faculty mentoring process to improve academic-clinical partnerships for nurse led evidence based practice and research projects. *Journal of Professional Nursing*. https://doi.org/10.1016/j.profnurs.2020.04.015. April 25, Online ahead of print.

Hendricks-Ferguson, V. L., Barnes, Y. J., Cherven, B., Stegenga, K., Roll, L., Docherty, S. L., & Haase, J. E. (2017). Stories and music for adolescent/young adult resilience during transplant partnerships: Strategies to support academic-clinical nurse collaborations in behavioral intervention studies. *Clinical Nurse Specialist*, *31*(4), 195–200. https://doi.org/10.1097/NUR.0000000000000305.

Huston, C. L., Phillips, B., Jeffries, P., Todero, C., Rich, J., Knecht, P., Sommer, S., & Lewis, M. P. (2017). The academic-practice gap: Strategies for an enduring problem. *Nursing Forum*, *53*(1), 27–34, https://doi.org/10.1111/nuf.12216.

Logsdon, M. C., Kleiner, C., Oster, C. A., Smith, C. D., Bergman-Evans, B., Kempnich, J. M.,Hogan, F., & Myers, J. (2017). Description of nurse scientists in a large health care system. *Nursing Administration Quarterly*, *41*(3), 266-274. https://doi.org/10.1097/naq.0000000000000023

Lynn, M. R. (1986). Determination and quantification of content validity. *Nursing Research*. *35*, 382-385.

McKee, G., Codd, M., Dempsey, O., Gallagher, P., & Comiskey, C. (2017). Describing the implementation of an innovative intervention and evaluating its effectiveness in increasing research capacity of advanced clinical nurses: using the consolidated framework for implementation research. *BMC Nursing*, *16*, 21. https://doi.org/10.1186/s12912-017-0214-6.

Nabavi, F. H., Vanaki, Z., & Mohammadi, E. (2012). Systematic review: process of forming academic service partnerships to reform clinical education. *Western Journal of Nursing Research*, *34*(1), 118–141. https://doi.org/10.1177/0193945910394380.

Sadeghnezhad, M., Heshmati Nabavi, F., Najafi, F., Kareshki, H., & Esmaily, H. (2018). Mutual benefits in academic-service partnership: An integrative review. *Nurse Education Today*, *68*, 78–85. https://doi.org/10.1016/j.nedt.2018.05.019.

Sahs, J. A., Nicasio, A. V., Storey, J. E., Guarnaccia, P. J., & Lewis-Fernandez, R. (2017). Developing research collaborations in an academic clinical setting: Challenges and lessons learned. *Community Mental Health Journal*, *53*(6), 647–660. https://doi.org/10.1007/s10597-016-0073-8.

Siedlecki, S. L., & Albert, N. M. (2020). The growth of nursing research within a large healthcare system. *Applied Nursing Research*, *55*, 151291. https://doi.org/10.1016/j.apnr.2020.151291. Online ahead of print.

Tubbs-Cooley, H. L., Martsolf, D. S., Pickler, R. H., Morrison, C. F., & Wardlaw, C. E. (2013). Development of a regional nursing research partnership for academic and practice collaborations. *Nursing Research and Practice*, *2013*, 473864. https://doi.org/10.1155/2013/473864.

United States Department of Health and Human Services. (2009). *Part 46-Protection of Human Subjects; §46.102 Definitions*; page 131; Revised Jan 15, 2009.

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

How to cite this article: Albert NM, Chipps E, Klein CJ, et al. A cross-sectional study of United States Academic-clinical research collaborations: Characteristics, resources, benefits and outcomes. *J Clin Nurs*. 2022;31:435–444. https://doi.org/10.1111/jocn.15597